WHAT IS CLAIMED IS:

1. A vertical cavity surface emitting laser comprising:

a hybrid mirror comprising

semiconductor mirror layers,

an anti-phase layer deposited on said semiconductor mirror layers,

a dielectric mirror layers deposited on said anti-phase layer; and

an ohmic contact formed on said anti-phase layer, within said hybrid mirror wherein said ohmic contact and said anti-phase layer provide mode selective optical loss to suppress higher order modes.

2. The vertical cavity surface emitting laser of claim 1 further comprising one or more current constriction apertures that inhibit current from being injected into material beneath said ohmic contact.

3. The vertical cavity surface emitting laser of claim 2 wherein said current constriction comprises an ion constriction layer formed by ion implantation within an active layer of said VCSEL.

4. The vertical cavity surface emitting laser of claim 1 further comprising a lateral index guide for controlling modal overlap with said optical loss.

5. The vertical cavity surface emitting laser of claim 4 wherein said lateral index guide comprises oxidation layers.

6. The vertical cavity surface emitting laser of claim 1 wherein said dielectric mirror layers comprise alternating quarter wavelength layers of silicon nitride and silicon dioxide.

7. The vertical cavity surface emitting laser of claim 3 wherein said lateral index guide comprises a thermal lens formed by joule heating from current injection which creates a positive change in index with temperature gradients.

8. The vertical cavity surface emitting laser of claim 1 wherein said hybrid mirror further comprises:

a dielectric spacer layer formed on said anti-phase layer, wherein said dielectric mirror layers are distributed across said dielectric spacer layer and said ohmic contact, and wherein total

thickness of said anti-phase layer and dielectric spacer is an integer multiple of a half wavelength.

9. The vertical cavity surface emitting laser of claim 4 wherein thickness of a layer between said dielectric mirror and said semiconductor mirror is spatially varied to introduce an effective lateral index guide by shifting cavity mode of said VCSEL without substantially altering cavity loss of said VCSEL.

10. The vertical cavity surface emitting laser of claim 9 wherein said spatial variation of said layer between said dielectric mirror and said semiconductor mirror comprises a step function variation.

11. The vertical cavity surface emitting laser of claim 9 wherein said spatial variation of said layer between said dielectric mirror and said semiconductor mirror comprises a radial variation for single mode operation.

12. The vertical cavity surface emitting laser of claim 4 wherein an upper surface of said semiconductor mirror layer is spatially varied to introduce an effective lateral index guide by shifting cavity mode of said VCSEL without substantially altering cavity loss of said VCSEL.

13. A vertical cavity surface emitting laser comprising:

a lateral index guide to suppress higher order modes, wherein said lateral index guide comprises

a hybrid mirror having semiconductor mirror layers;

a dielectric spacer layer formed on said semiconductor mirror layers; and

dielectric mirror layers formed on said dielectric spacer layer, wherein the thickness of said dielectric spacer layer is spatially varied to radially alter resonant cavity wavelength of said VCSEL and thereby providing a lateral index guide.

14. The vertical cavity surface emitting laser of claim 13 further comprising:

an anti-phase layer formed on uppermost semiconductor mirror layer, and

an ohmic contact formed on said anti-phase layer, wherein said ohmic contact and said anti-phase layer provide spatially varying optical loss so as to further suppress higher order modes.

15. The vertical cavity surface emitting laser of claim 14 further comprising one or

more current constriction apertures that inhibit current from being injected into material beneath said ohmic contact.

16. The vertical cavity surface emitting laser of claim 15 wherein said current constriction further comprises an ion constriction layer formed by ion implantation within an active layer of said VCSEL.

17. A method of fabricating a single mode vertical cavity surface emitting laser comprising:

forming a first mirror on a substrate;

forming an active layer and cavity on said first mirror layer;

forming a semiconductor mirror on said active layer;

forming an anti-phase layer on said semiconductor mirror layer;

forming an ohmic contact on said anti-phase layer; and

forming a dielectric mirror on said anti-phase layer;

wherein said ohmic contact and said anti-phase layer provide mode selective optical loss to suppress higher order modes.

18. The method of claim 17 further comprising forming one or more current construction apertures to inhibit current from being injected into material beneath said ohmic contact.

19. The method of claim 18 further comprising forming a lateral index guide to control modal overlap with said optical loss.

20. A method of fabricating a single mode vertical cavity surface emitting laser comprising:

forming a first mirror on a substrate;

forming an active layer on said first mirror layer;

forming a second mirror on said active layer;

forming a dielectric spacer layer on said second mirror layer;

forming a dielectric mirror on said dielectric spacer layer; and

varying phase of said dielectric spacer layer to form a lateral index guide, thereby suppressing higher order modes.